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09/708,590	11/09/2000	Masato Muraki	35.G2732	2106

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EXAMINER

FERNANDEZ, KALIMAH

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 03/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/708,590

Applicant(s)

MURAKI ET AL.

Examiner

Kalimah Fernandez

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 November 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### **Drawings**

2. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-3, 6 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by US Pat No 5,955,738 issued to Manabe et al. Manabe discloses an exposure data apparatus a CPU (13), which stores a basic/standard dosage (col. 11, lines 22-44), storing calibration data calculated by a beam dosage calibration unit (14) (col.7, lines 25-37), and storing correction data for correcting the influence of the proximity effect (col.19, lines 26-51).
5. According to acquired data obtained by CPU (13), Manabe discloses the electron beam control (101) controlling the irradiation of a charged particle beam (col.3, lines 38-49).
6. As per claim 2, Manabe discloses the definition of a map (col.6, lines 7-17).
7. As per claim 4, Manabe discloses the calibration data based on exposure data (col.7, lines 25-28).
8. As per claim 6, Manabe discloses in col.8, line 48- col.9, line 12.
9. As per claim 15, Manabe discloses the exposure of a pattern onto a wafer (col.23, lines 25-67).

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 7,9-10, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manabe and US Pat No 5,313,068 issued to Meiri et al.
12. As per claim 7, Manabe discloses the creating a reference dose according to the position of an exposure pattern (col.19, lines 10-42); creating a supplementary exposure pattern according to proximity effect correction data (col.19, lines 44-51). Manabe discloses the computation of a correction ratio for correcting proximity effect based on a map-to-map calculation (col.19, lines 30-34).
13. In regards to the determination of an optimum proximity effect correction, Manabe discloses the determination of a final (or optimal dosage, which adequately corrects the influence of the proximity effects (col.22, lines 30-65).
14. Manabe does not disclose the use a sensor to compute the calibration of electron optical system elements.
15. However, Meiri teaches an E-beam apparatus and proximity effect correction method, which employs a backscattering determination to calculate calibration data of the E-beam lithography system (col. 4, lines 58-62).
16. It is held that an ordinary skilled artisan would have known at the time this invention was made to incorporate a backscatter detector for characterizing calibration data of the system from generally available knowledge in the art as gleaned from Meiri's disclosure.
17. As per claim 9, Manabe teaches an evaluation of the exposed pattern to determine the appropriate correction dosage (col.15, lines 18-32).

18. As per claim 10, Manabe teaches the basic dosage based on map data supplied by the map preparing editor (col.11, lines 30-36).

19. As per claims 12-13, Manabe teaches the application of a supplementary exposure for proximity effect based on the condition of the pattern (i.e. the pattern density) (col.7, lines 9-24).

20. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manabe and US Pat No. 5614725 issued to Oae et al.

21. Manabe teaches the claimed invention except for a faraday cup and the determination of a ratio of the irradiation time to the non-irradiation time.

22. However, Oae teaches the use of a faraday cup (150,151) for monitoring the result of the irradiation (col.35, line 63-col.36, line 17).

23. Oae, also, teaches a system clock, which sets exposure time based upon the sensitivity of the resist (col.30, lines 40-46).

24. It is held that an ordinary skilled artisan would have known to incorporate the teachings of Oae into Manabe's apparatus, since the use of Faraday cups are well known as illustrated by Oae and the obvious advantage of improving writing precision. In addition, it is well known in the art that irradiation damage caused by the E-beam depends on the condition of the sample (i.e. resist), therefore it is held that Oae's disclosure of employing a exposure time clock to monitor the irradiation would have obviously motivated an ordinary skilled artisan to modify Manabe's apparatus in order to account for the influence of the e-beam on the resist of the sample.

Art Unit: 2881

25. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manabe and Meiri as applied to claim 7 above, and further in view of US Pat 4,451,738 issued to Smith.

26. The obvious combination of Manabe and Meiri has been discussed except for visual inspection limitation. However, Smith is relied upon to illustrate that backscatter detector, which enable visual inspection (i.e. connected to a visual display) is well expected and common in the art (col.5, lines 60-65 of Smith).

27. Claims 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manabe and Meiri as applied to claim 7 above, and further in view of Oae '725.

28. The obvious combination of Manabe and Meiri has been discussed except for the irradiation time limitation and faraday cup.

29. However, Oae teaches the use of a faraday cup (150,151) for monitoring the result of the irradiation (col.35, line 63-col.36, line 17).

30. Oae, also, teaches a system clock, which sets exposure time based upon the sensitivity of the resist (col.30, lines 40-46).

31. It is held that an ordinary skilled artisan would have known to incorporate the teachings of Oae into Manabe's apparatus, since the use of Faraday cups are well known as illustrated by Oae and the obvious advantage of improving writing precision. In addition, it is well known in the art that irradiation damage caused by the E-beam depends on the condition of the sample (i.e. resist), therefore it is held that Oae's disclosure of employing a exposure time clock to monitor the irradiation would have

Art Unit: 2881

obviously motivated an ordinary skilled artisan to modify Manabe's apparatus in order to account for the influence of the e-beam on the resist of the sample.


**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kalimah Fernandez whose telephone number is 703-305-6310. The examiner can normally be reached on Mon-Fri between 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Lee can be reached on 703-308-4116. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

kf  
March 20, 2002

  
JOHN R. LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800